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Dated

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P01/7700 0.00-0201155.9

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Notes

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The Patent Office
Request for grant of a Patent
Form 1/77
Patents Act 1977

1 Title of invention

1 Please give the title of the invention

HINGE IMPROVEMENTS FOR
A
COLLAPSIBLE FLATPACK.

2 Applicant's details

☐ First or only applicant

2a If you are applying as a corporate body please give:
Corporate name

Country (and State
of incorporation, if
appropriate)

2b If you are applying as an individual or one of a partnership please give in full:

Surname

CLIVE-SMITH

Forenames

MARTIN

2c In all cases, please give the following details:

Address

WOOTTON PADDY
LEEK WOOTTON
WARWICKSHIRE

UK postcode
(if applicable)

CV 35 7GX

Country

ADP number
(if known)

4112173003

2d, 2e and 2f: If there are further applicants please provide details on a separate sheet of paper.

☐ **Second applicant (if any)**

2d If you are applying as a corporate body please give:
Corporate name

Country (and State
of incorporation, if
appropriate)

2e If you are applying as an individual or one of a partnership please give in full:

Surname **KENDRICK.**

Forenames **PETER WALTER**

2f In all cases, please give the following details:

Address **LAWFORD LANE**

RUGBY

WARWICKSHIRE.

UK postcode
(if applicable)

Country

ADP number
(if known)

● An address for service in the
United Kingdom must be supplied

Please mark correct box

● **Address for service details**

3a Have you appointed an agent to deal with your application?

Yes ☐ No ☒ **go to 3b**

↓
please give details below

Agent's name

Agent's address

Postcode

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3b: If you have appointed an agent, all
correspondence concerning your
application will be sent to the agent's
United Kingdom address.

3b If you have not appointed an agent please give a name and address in the
United Kingdom to which all correspondence will be sent:

Name **M. CLIVE-SMITH**

Address **WOOTTON PADDOX**

LEEK WOOTTON

WARWICKSHIRE

Postcode **CV35 7QX**

ADP number
(if known)

Daytime telephone
number (if available)

**01926
863 140**

- The answer must be 'No' if:
- any applicant is not an inventor
- there is an inventor who is not an applicant, or
- any applicant is a corporate body.

● Please supply duplicates of claim(s), abstract, description and drawing(s).

● Inventorship

7 Are you (the applicant or applicants) the sole inventor or the joint inventors?

Please mark correct box

Yes ☒

No ☐

A Statement of Inventorship on Patents Form 7/77 will need to be filed (see Rule 18).

● Checklist

8a Please fill in the number of sheets for each of the following types of document contained in this application.



Continuation sheets for this Patents Form 1/77

—

Claim(s)

—

Description

3

Abstract

—

Drawing(s)

4 only

8b Which of the following documents also accompanies the application?

Priority documents (please state how many)

Translation(s) of Priority documents (please state how many)

Patents Form 7/77 – Statement of Inventorship and Right to Grant (please state how many)

Patents Form 9/77 – Preliminary Examination/Search

Patents Form 10/77 – Request for Substantive Examination

Please mark correct box(es)

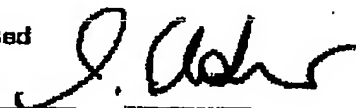
① You or your appointed agent (see Rule 90 of the Patents Rules 1990) must sign this request.

● Request

I/We request the grant of a patent on the basis of this application.

Please sign here ➡

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Date

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HINGE IMPROVEMENTS FOR A COLLAPSABLE FLATRACK

In the field of collapsible flatrack shipping containers there is a common type of flatrack, comprising of a rectangular platform base with a wall at each end attached pivotally to the base which folds down onto the base for economical storage and transport. In service these flatracks have a rough time, there being no superstructure between the 2 end walls to hold them upright. The end walls are locked at each corner by a lockable hinge, but that does not prevent users picking up these flatracks by the top corner fittings with inclined slings which tend to pull the end walls inwards and very often cause the hinges or corner posts to break. Education in the industry has gone so far, but where there is a shortage of proper lifting equipment to lift the flatracks by the top corner fittings in a vertical direction, the sling lifting will often be too tempting for a poorly educated operator to resist. Thus it is desirable to find a means to increase the strength of the corner posts and hinges in a low cost manner (commercial considerations always being important) to help withstand the collapsing forces which act on the corner posts and hinges.

One of the stronger types of flatracks in the market use an "I" section corner post which is very strong against collapsing forces which is fixed to a solid plate hinge inner. The trouble with the solid plate hinges is that they are extremely heavy and expensive to make. The plate has to be drilled through accurately to accommodate the pivot pins and locking pins which lock this hinge to the base. In the market containers are also getting taller and of course the taller the corner posts go the greater the racking forces become on the hinges and posts near the bottom, so once again it is desirable to make posts and hinges stronger to resist these forces.

It is also desirable for containers to be able to carry more and more cargo in each consignment so as well as going taller, heavy cargos also require a lighter weight flatrack. Thus it would be desirable if a lighter weight, stronger and cheaper hinge could be provided in the manufacture of collapsible flatracks. In the present invention there is provided a hinge inner for a collapsible flatrack, comprising a composite beam, having inner and outer flanges, spaced apart by a web plate, the outer flange having a cut out formed in it for receiving locking block.

In figure (1) there is seen a side elevation of a collapsible flatrack (1) having a floor surface (2) an end wall (3). At each bottom corner there is a corner fitting (4) and a hinge outer (11) into which is arranged a hinge inner (8) pinned to the base (10) at pivot pin (9). The top of the hinge outer (11) is capped by a top fitting (5) through which the hinge inner (8) passes when the corner posts (7) is in the erect vertical position. At the top of each corner post (7) there is seen a top fitting (6) to which is attached a hook (12) and a sling (13). The sling can be seen to be inclined to the vertical (v) by angle (a). Should the flatrack (1) be lifted by means of the angled slings (13), a horizontal component (h) is generated in the top fitting (6) causing a bending movement of some considerable size to be generated in the hinge inner (8) and outer (11).

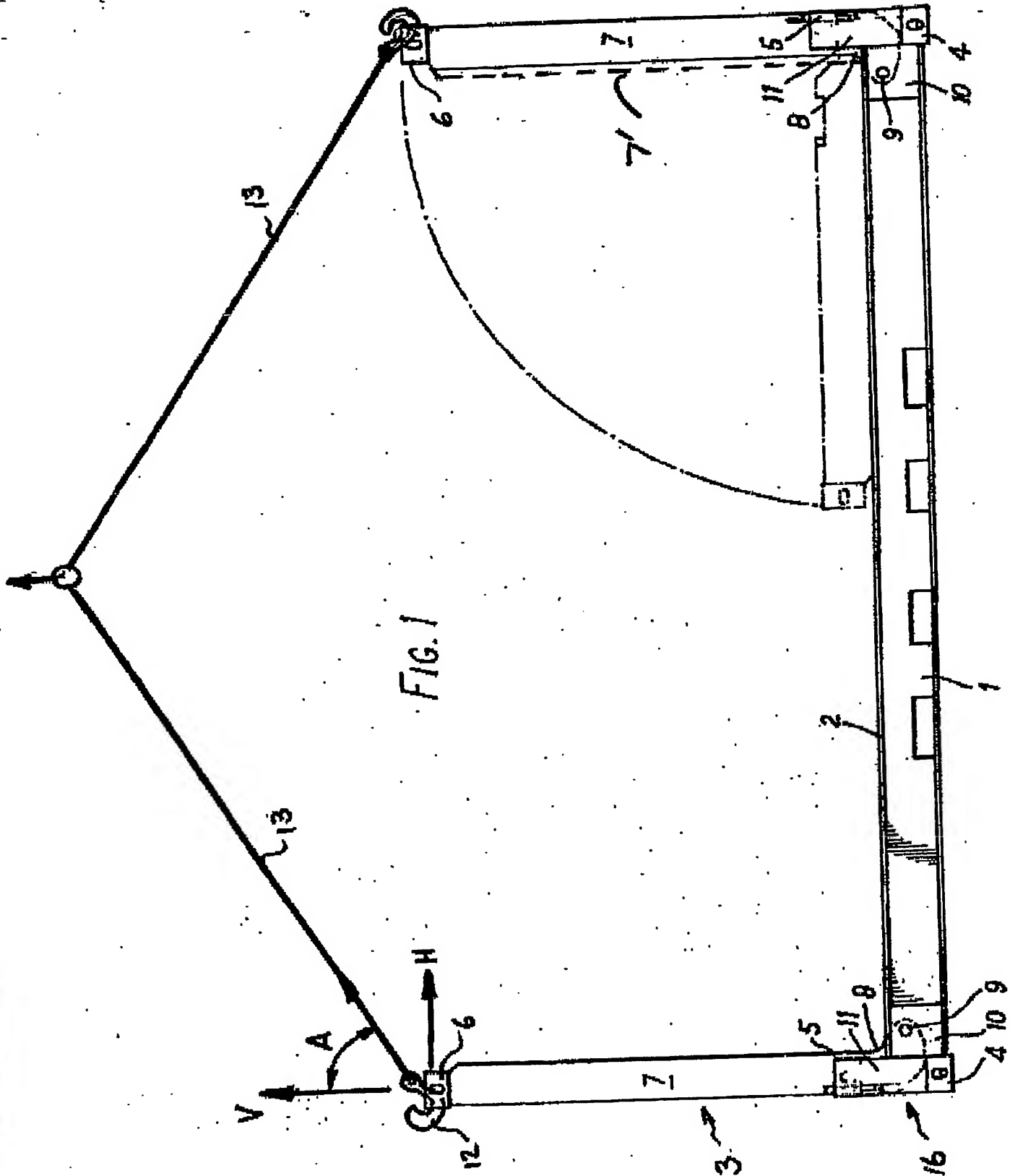
In figure (2) there is seen an enlarged view of the hinge with the outer (11) cut away to reveal the hinge inner (8) comprising an 'L' shaped profile in heavy plate. Typical thickness of the plate would be 60mm. Top plate (5) can be seen in section, where it has been cut away and inner (8) passes through top plate (5). Pivot pin (9) can be seen attached to base (10) and corner post (7) attached to inner (8). Typical attachment is by heavy duty welding between the flanges (14) and (15) of corner post (7) to inner (8). In the erect position as shown the hinge (16) comprising outer (11) and inner (8) is prevented from folding down onto base (10) by a locking pin (17) which blocks the movement of heel (18) of inner (8) and back plate (19) of top plate (5). Only when pin (17) is withdrawn can the heel (18) pass by back plate (19) and allow the hinge to fold through approximately 90° together with corner post (7) onto or adjacent to base (10).

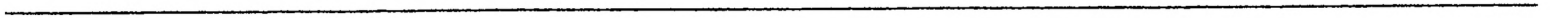
Returning to figure (1), when the hinge is locked and the corner posts vertically erect, it is important to maintain the geometry of the top fitting (6) so that standardised handling machines and other containers can be interfaced with the corner fitting (6) without adjustment. Thus it is important that the pivot pin (9) and locking pin (17) locate accurately with heel (18) and back plate (19) to stop post (7) from wobbling about, thus in manufacture of the hinge inner (8) the recess (20) into which the locking pin fits when locked, and the position of the pivot pin (9) in relation to the locking pin (17) and recess (20) must be accurately machined to maintain geometry. However the inner (8) weighs some 50 or 60 kilos typically, thereby substantially reducing the opportunities for high speed CNC machines to carry out the machining.

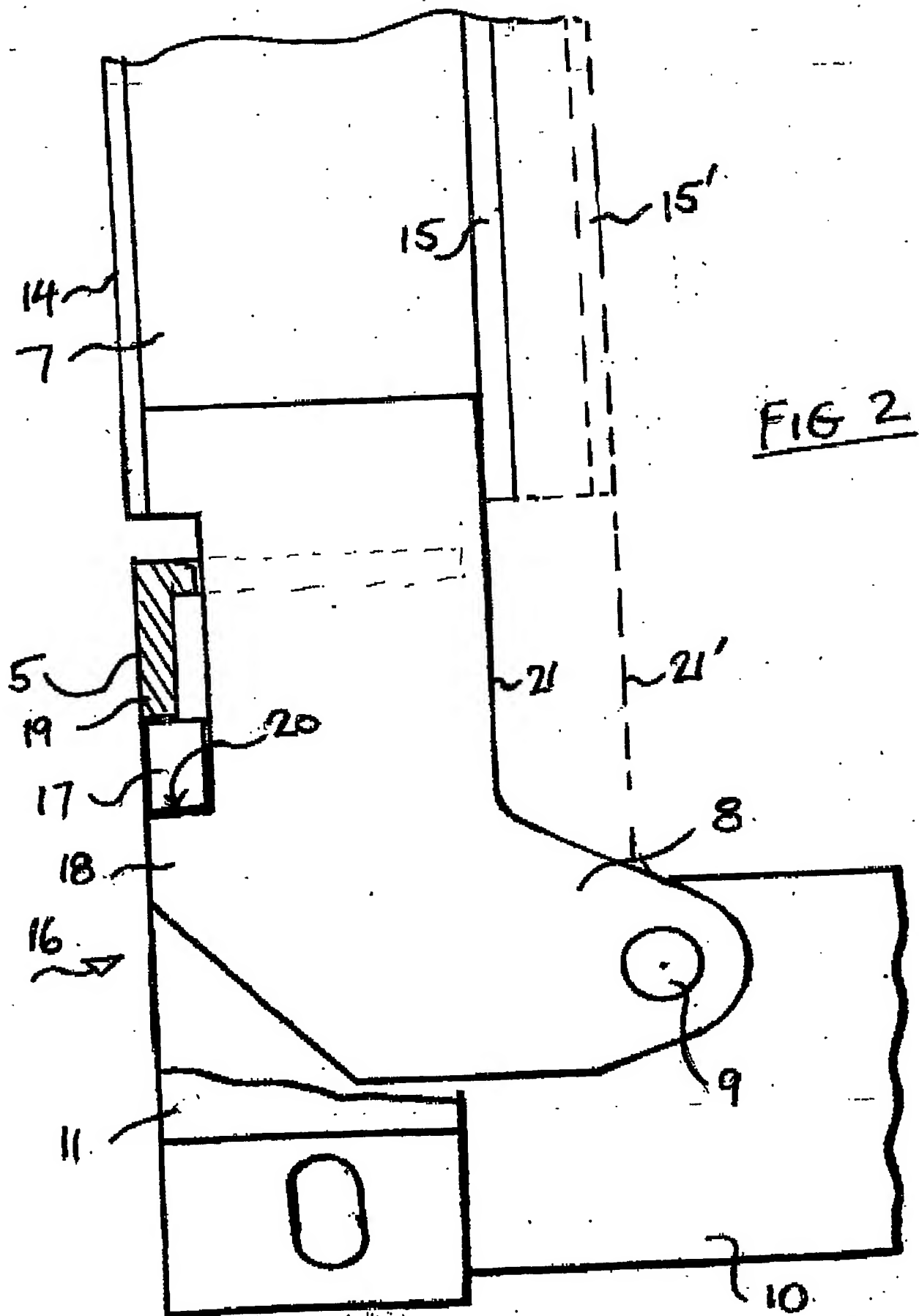
Returning to figure (1), the right hand corner post (7), if it is to be increased in strength, this would most economically be done so by increasing its depth to dotted line (7) dashed. In figure (2) the flange (15) when increasing the depth of post (7) can be seen repositioned to flange (15) dashed. Likewise the hinge inner must also be increased in depth to maintain strength, so that the leading face (21) of inner (8) might be moved to face (21) dashed, however it can be observed that this represents a very substantial increase in not only strength, which is desirable, but weight and cost of the hinge inner (8) which is not desirable.

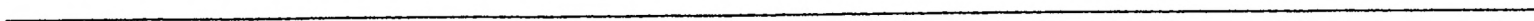
In figure (3) there is seen an embodiment of invention in which the hinge inner (8) has been replaced by a fabricated inner (22) comprising inboard flange (23), outboard flange (24) and top and bottom flanges (25) and (26). These are spaced apart by a web plate (27). The web plate (27) might comprise one or more relatively thin plates which are welded all the way round its perimeter to the flanges (23), (24), (25), and (26). The corner post (7) has inboard flange (15) dashed at the deeper position described earlier. In the event that the corner post and hinge are to be made narrower or wider, it is a simple matter to transpose the inboard flange (23) to a new position to suit the inboard flange of the corner post (15) dashed merely by changing the size of the web (27). In production the outboard flange (24) has recess (20) machined in it as previously, but in this example the outboard flange (24) is very much lighter weight than the large hinge inner (8) and thus be placed by hand into a CNC machine tool very quickly and cheaply for accurate machining. Similarly the pivot boss (28) can be machined as a *small component* on a lathe with the hole bored out accurately. By careful jiggling the components can then be placed and clamped together and finally welded by manual means or robot without the need to carry out any further machining on the relatively heavy fabricated assembly, comprising inner (22). In terms of stress in bending in the plane of the paper which forms figure (3), the web (27) can be relatively thin compared to the heavy hinge plate (8) which you will recall was 60mm deep, whereas this web (27) might be as little as 10mm

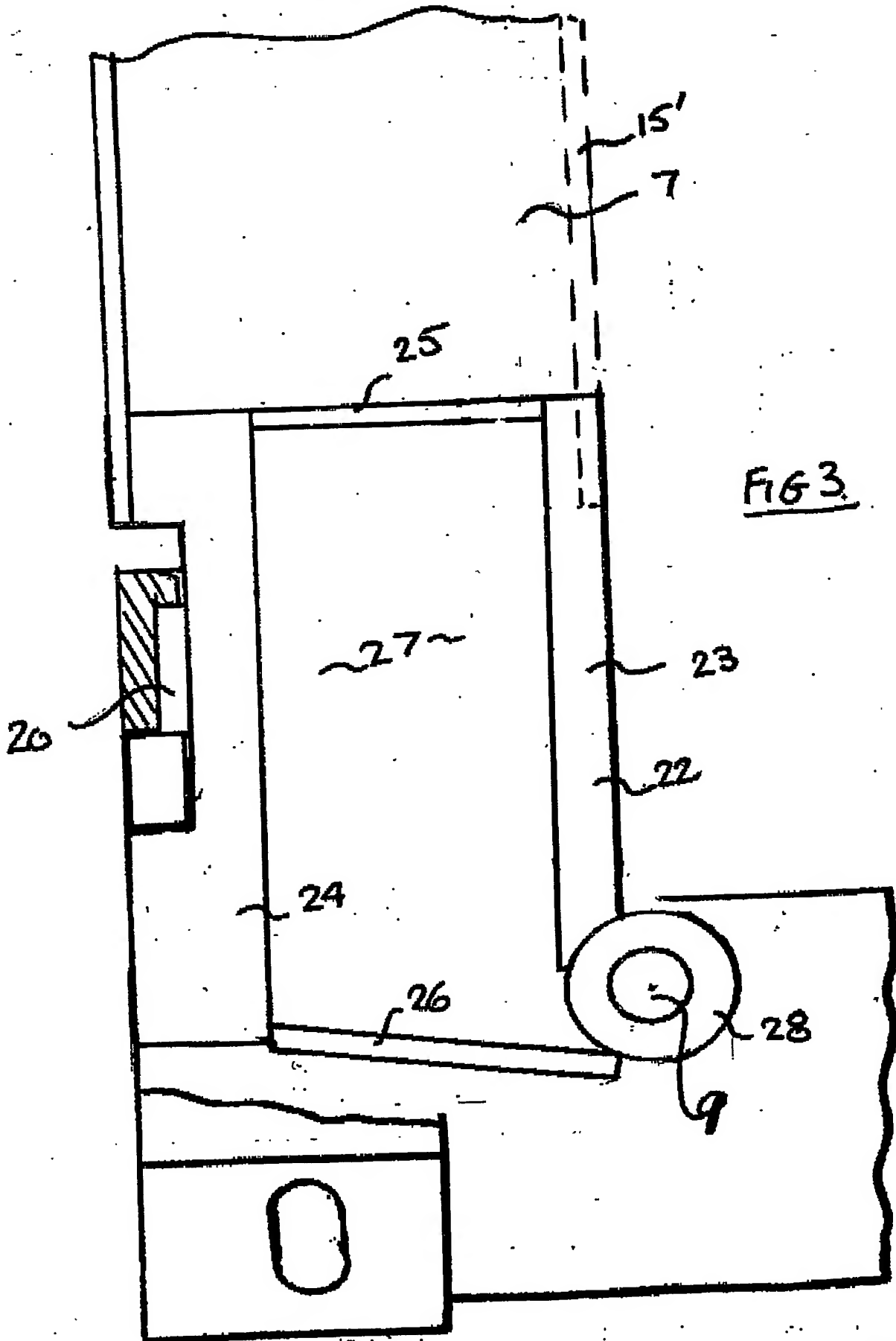


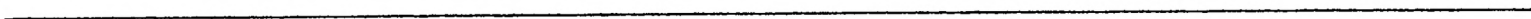


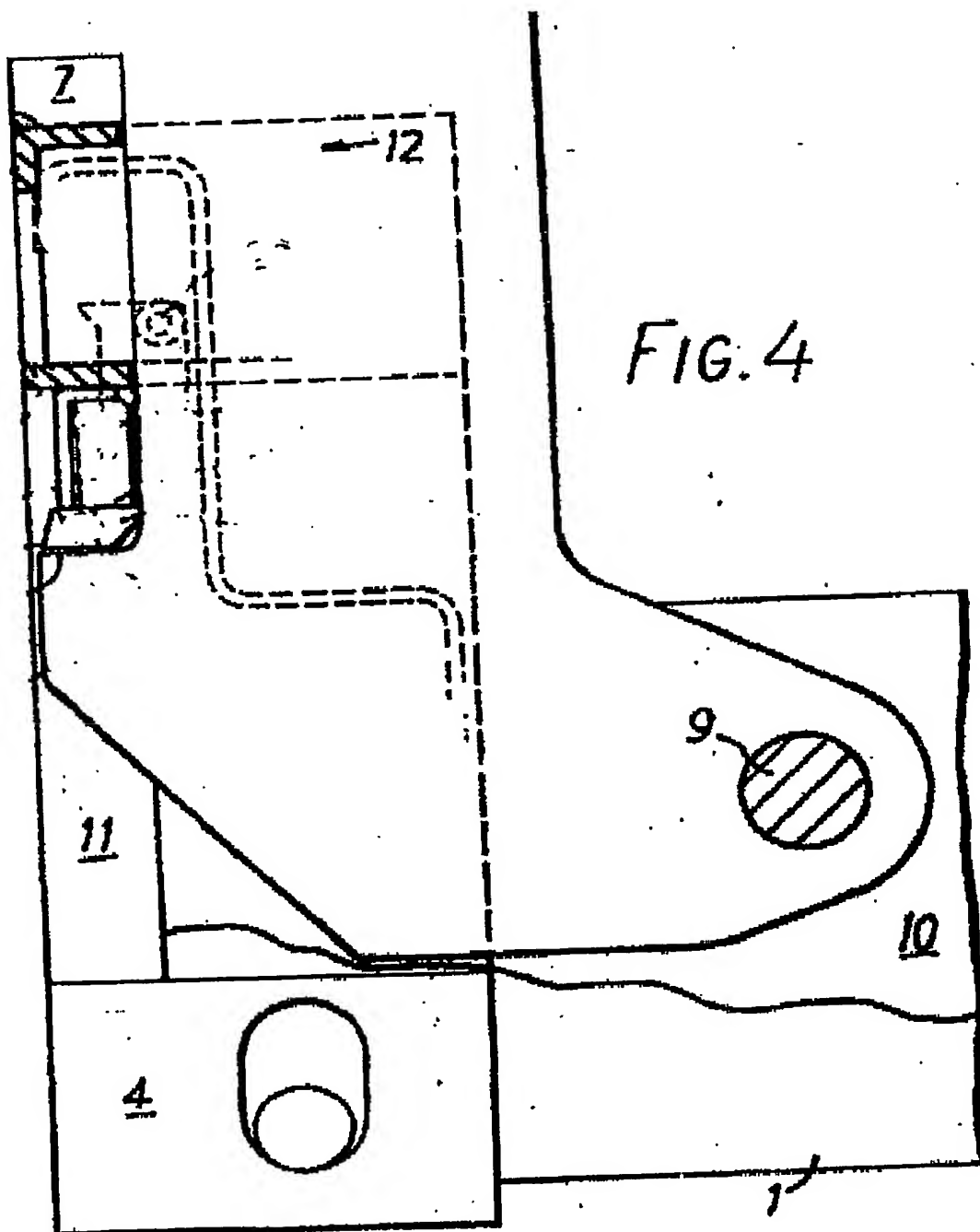












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